	Application No.	Applicant(s)
Interview Summary	10/757,961	FILIPPINI ET AL.
	Examiner	Art Unit	
	Prabodh M. Dharia	2629	

All participants (applicant, applicant's representative, PTO personnel):

(1) _Prabodh M. Dharia_.   (3)_____.

(2) _Carol W. Burton_.   (4)_____.

Date of Interview: _01 October 2007_.

Type: a)☒ Telephonic   b)☐ Video Conference
        c)☐ Personal [copy given to: 1)☐ applicant   2)☒ applicant's representative]

Exhibit shown or demonstration conducted: d)☐ Yes   e)☒ No.
     If Yes, brief description: _None_.

Claim(s) discussed: _1 and 33_.

Identification of prior art discussed: _IDS_.
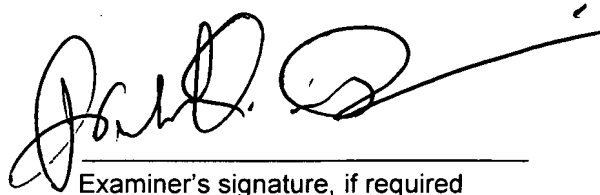
Agreement with respect to the claims f)☐ was reached.   g)☐ was not reached.   h)☒ N/A.

Substance of Interview including description of the general nature of what was agreed to if an agreement was reached, or any other comments: _Applicant's representative helped resolve typographical errors issue. Examiner and applicant's representative discussed allowable limitations of newly added claims 33-41 and claim 1. Applicant representative provided the clarification of various limitations of newly added independent claim 33_.

(A fuller description, if necessary, and a copy of the amendments which the examiner agreed would render the claims allowable, if available, must be attached. Also, where no copy of the amendments that would render the claims allowable is available, a summary thereof must be attached.)

THE FORMAL WRITTEN REPLY TO THE LAST OFFICE ACTION MUST INCLUDE THE SUBSTANCE OF THE INTERVIEW. (See MPEP Section 713.04). If a reply to the last Office action has already been filed, APPLICANT IS GIVEN A NON-EXTENDABLE PERIOD OF THE LONGER OF ONE MONTH OR THIRTY DAYS FROM THIS INTERVIEW DATE, OR THE MAILING DATE OF THIS INTERVIEW SUMMARY FORM, WHICHEVER IS LATER, TO FILE A STATEMENT OF THE SUBSTANCE OF THE INTERVIEW. See Summary of Record of Interview requirements on reverse side or on attached sheet.

Examiner Note: You must sign this form unless it is an Attachment to a signed Office action.

_____
Examiner's signature, if required

Summary of Record of Interview Requirements

Manual of Patent Examining Procedure (MPEP), Section 713.04, Substance of Interview Must be Made of Record
A complete written statement as to the substance of any face-to-face, video conference, or telephone interview with regard to an application must be made of record in the application whether or not an agreement with the examiner was reached at the interview.

Title 37 Code of Federal Regulations (CFR) § 1.133 Interviews
Paragraph (b)
In every instance where reconsideration is requested in view of an interview with an examiner, a complete written statement of the reasons presented at the interview as warranting favorable action must be filed by the applicant. An interview does not remove the necessity for reply to Office action as specified in §§ 1.111, 1.135. (35 U.S.C. 132)

37 CFR §1.2 Business to be transacted in writing.
All business with the Patent or Trademark Office should be transacted in writing. The personal attendance of applicants or their attorneys or agents at the Patent and Trademark Office is unnecessary. The action of the Patent and Trademark Office will be based exclusively on the written record in the Office. No attention will be paid to any alleged oral promise, stipulation, or understanding in relation to which there is disagreement or doubt.

The action of the Patent and Trademark Office cannot be based exclusively on the written record in the Office if that record is itself incomplete through the failure to record the substance of interviews.

It is the responsibility of the applicant or the attorney or agent to make the substance of an interview of record in the application file, unless the examiner indicates he or she will do so. It is the examiner's responsibility to see that such a record is made and to correct material inaccuracies which bear directly on the question of patentability.

Examiners must complete an Interview Summary Form for each interview held where a matter of substance has been discussed during the interview by checking the appropriate boxes and filling in the blanks. Discussions regarding only procedural matters, directed solely to restriction requirements for which interview recordation is otherwise provided for in Section 812.01 of the Manual of Patent Examining Procedure, or pointing out typographical errors or unreadable script in Office actions or the like, are excluded from the interview recordation procedures below. Where the substance of an interview is completely recorded in an Examiners Amendment, no separate Interview Summary Record is required.

The Interview Summary Form shall be given an appropriate Paper No., placed in the right hand portion of the file, and listed on the "Contents" section of the file wrapper. In a personal interview, a duplicate of the Form is given to the applicant (or attorney or agent) at the conclusion of the interview. In the case of a telephone or video-conference interview, the copy is mailed to the applicant's correspondence address either with or prior to the next official communication. If additional correspondence from the examiner is not likely before an allowance or if other circumstances dictate, the Form should be mailed promptly after the interview rather than with the next official communication.

The Form provides for recordation of the following information:
- Application Number (Series Code and Serial Number)
- Name of applicant
- Name of examiner
- Date of interview
- Type of interview (telephonic, video-conference, or personal)
- Name of participant(s) (applicant, attorney or agent, examiner, other PTO personnel, etc.)
- An indication whether or not an exhibit was shown or a demonstration conducted
- An identification of the specific prior art discussed
- An indication whether an agreement was reached and if so, a description of the general nature of the agreement (may be by attachment of a copy of amendments or claims agreed as being allowable). Note: Agreement as to allowability is tentative and does not restrict further action by the examiner to the contrary.
- The signature of the examiner who conducted the interview (if Form is not an attachment to a signed Office action)

It is desirable that the examiner orally remind the applicant of his or her obligation to record the substance of the interview of each case. It should be noted, however, that the Interview Summary Form will not normally be considered a complete and proper recordation of the interview unless it includes, or is supplemented by the applicant or the examiner to include, all of the applicable items required below concerning the substance of the interview.

A complete and proper recordation of the substance of any interview should include at least the following applicable items:
1) A brief description of the nature of any exhibit shown or any demonstration conducted,
2) an identification of the claims discussed,
3) an identification of the specific prior art discussed,
4) an identification of the principal proposed amendments of a substantive nature discussed, unless these are already described on the Interview Summary Form completed by the Examiner,
5) a brief identification of the general thrust of the principal arguments presented to the examiner,
   (The identification of arguments need not be lengthy or elaborate. A verbatim or highly detailed description of the arguments is not required. The identification of the arguments is sufficient if the general nature or thrust of the principal arguments made to the examiner can be understood in the context of the application file. Of course, the applicant may desire to emphasize and fully describe those arguments which he or she feels were or might be persuasive to the examiner.)
6) a general indication of any other pertinent matters discussed, and
7) if appropriate, the general results or outcome of the interview unless already described in the Interview Summary Form completed by the examiner.

Examiners are expected to carefully review the applicant's record of the substance of an interview. If the record is not complete and accurate, the examiner will give the applicant an extendable one month time period to correct the record.

Examiner to Check for Accuracy

If the claims are allowable for other reasons of record, the examiner should send a letter setting forth the examiner's version of the statement attributed to him or her. If the record is complete and accurate, the examiner should place the indication, "Interview Record OK" on the paper recording the substance of the interview along with the date and the examiner's initials.

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CLAIMS

1. A method of converting digital signals between a first (IS) and second (OS) format, the method including the step of generating coefficients (X_n) representative of such digital signals and the step of subjecting such coefficients to quantization (q), ~~wherein the method~~ ~~characterized in that it~~ includes the steps of:
- $<->$ generating a dither signal (W_n), and ⟍ from page 43
- adding said dither signal (W_n) to said coefficients (X_n) before said quantization (q) to generate a quantized signal, and
- subjecting such quantized signal to inverse quantization, ~~and~~
~~3. The method of claims 1 or 2,~~ characterized in that it includes the step of:⟶ leaving
~~- subtracting said dither signal (W_n) from~~ said signal subjected to inverse quantization exempt from correction effected by subtracting therefrom said dither signal (W_n), whereby said signal subjected to inverse quantization contains artifacts due to the non-linear characteristic of said quantization.

2. The method of claim 1, characterized in that it said quantization step is a uniform quantization step (q).

3̶/. The method of any of the previous claims, characterized in that it includes the steps of:
- subjecting each said coefficient (X_n) to a first quantization step (q1) in the absence of any said dither signal (W_n) being added to generate an undithered quantized coefficient,
- checking if said undithered quantized coefficient is equal to zero, and
- when said undithered quantized coefficient is equal to zero, taking said undithered quantization coefficient as said quantized signal, and
- when said undithered quantized coefficient is different from zero, adding said dither signal (W_n) to

said coefficient (X_n) and subjecting said dithered coefficient to a quantization step (q2) to generate said quantized signal.

4 8. The method of any of the previous claims, characterized in that the spectrum of said dither signal (W) is selected from the group consisting of : gaussian, uniform, sinusoidal and triangular.

5 9. The method of claim 4, characterized in that said dither signal (W_n) is generated as a pseudo-random variable having a uniform distribution by subsequently modifying said distribution to at least one distribution of said group.

6 7. The method of any of claims 1, 4 or 5, characterized in that said dither signal is generated from a plurality of independent pseudo-random variables.

~~8. The method of any of the previous claims, characterized in that it includes the step of~~ subjecting said digital signals to a discrete cosine transform (DCT) to generate said coefficients to be quantized as DCT coefficients,

7 9. The method of any of the previous claims, characterized in that said quantization is a part of a transcoding process between an input stream (IS) of digital signals at a first bitrate (B1) and an output stream of digital signals (OS) at a second bitrate (B2), said second bitrate (B2) of said output stream (OS) of digital signals being selectively controlled.

8 10. The method of claim 7, characterized in that said input stream (IS) is subject to a preanalysis process (232, 234) including:

- quantizing said signals with a given quantization step (mquant), and
- evaluating the number of bits spent for coding said coefficients, and in that said bitrate (B2)

of said output data stream (OS) is controlled as a function of said preanalysis.

9 ~~17~~. The method of claim ~~16~~ 8, characterized in that said control is of a proportional-integrative (PI) type.

10 ~~12~~. The method of either of claims ~~16~~ 8 or ~~11~~ 9, characterized in that said input stream (IS) is stream of digital video signals including pictures arranged in groups of pictures (GOP), and in that said bitrate control assign value of target bits for each single picture of a group of pictures (GOP).

11 ~~13~~. The method of any of the previous claims, characterized in that said quantization step (2 to 4) is a part of a transcoding process between an input stream of digital signals (IS) at a first bitrate (B1) and an output ~~bitrate~~ <-> (OS) at a second bitrate (B2), said transcoding process including subjecting at least part of said input digital signals to a low pass filtering step (218) followed by a downsampling step (220).

12 ~~14~~. The method of claim ~~16~~ 8 and claim ~~13~~ 11, characterized in that said low pass filtering (218) is performed before said preanalysis.

13 ~~15~~. The method of claim ~~13~~ 11, characterized in that together with said low-pass filtering (218) a decimation step is executed.

14 ~~16~~. The method of any of the previous claims, characterized in that said digital signals are, in at least one of said first and second formats, MPEG encoded signals.

15 ~~17~~. A system for converting digital signals between a first (IS) and second (OS) format, the system being configured (18) for generating coefficients (X_n) representative of such digital signals and including at least one quantizer (20; q; q1; q2) for subjecting such

<-> = < stream of digital signals >

coefficients to quantization, /wherein the system ~~characterized in that it~~
includes: - <-> ← from page 46

    - a source of a dither signal (W_n), and

    - an adder for adding said dither signal (W_n) to said coefficients (X_n) before said quantization (q) to generate a quantized signal,

    - an inverse quantizer for subjecting such quantized signal to inverse quantization, ~~and~~ by leaving said subject subjected to inverse quantization exempt from correction effected by subtracting therefrom said dither signal (W_n), whereby said signal subjected to inverse quantization contains artifacts due to the non-linear characteristic of said at least one quantizer (20; q; q1; q2).

16 ~~18~~. The system of claim 17 characterized in that it said quantizer (20; q; q1; q2) is a uniform quantizer (q).

17 ~~20~~. The system of either ~~any~~ of the previous claims 15 ~~19~~ to ~~or~~ 16 ~~19~~, characterized in that it includes:

    - a first quantizer (q1) for subjecting each said coefficient (X_n) to a first quantization step in the absence of any said dither signal (W_n) being added to generate an undithered quantized coefficient,

    - a control module (100) for checking if said undithered quantized coefficient is equal to zero,

    - an output element (102) for taking said undithered quantization coefficient as said quantized signal when said undithered quantized coefficient is equal to zero, and

    - an adder (104) for adding said dither signal (W_n) to said coefficient (X_n) when said undithered quantized coefficient is different from zero, and a second quantizer (q2) for subjecting said dithered coefficient to a quantization step to generate said quantized signal for feeding to said output element (102).

18 21. The system of any of the previous claims 17 to
17 20, characterized in that said source of said dither
signal (W) is a source of signal having a distribution
selected from the group consisting of: gaussian,
5 uniform, sinusoidal and triangular.

19 22. The system of claim 21, characterized in that
said source is a source of a pseudo-random variable
having a uniform distribution having associated a
distribution modifier element for modifying said
10 distribution to at least one distribution of said
group.

20 23. The system of any of claims 17, 21 or 22,
characterized in that said source of dither signal
includes a plurality of sources of independent pseudo-
15 random variables.

24. The system of any of the previous claims,
characterized in that it includes a DCT transform
module (18) for subjecting said digital signals to a
discrete cosine transform (DCT) to generate said
20 coefficients to be quantized as DCT coefficients,

21 25. The system of any of the previous claims 17 to
20 24, as a part of a transcoder for transcoding an input
stream (IS) of digital signals at a first bitrate (B1)
into an output stream (OS) of digital signals at a
25 second bitrate (B2), including a bitrate control block
(234) for selectively controlling said second bitrate
(B2) of said output stream (OS) of digital signals.

22 26. The system of claim 21, characterized in that
it includes a preanalysis chain (224, 232, 234) for
30 subjecting said input stream (IS) to a preanalysis
process (232, 234), said chain including:
- a quantizer (224) for quantizing said signals with
a given quantization step (mquant), and

- a bit usage profile module (232) for evaluating the number of bits spent for coding said coefficients,

- and in that said bitrate control block (234) is configured for controlling the bitrate (B2) of said output data stream (OS) as a function of said preanalysis.

23. The system of claim 22, characterized in that said bitrate control block (234) includes a proportional-integrative (PI) controller.

24. The system of either of claims 22 or 23, for use in connection with an input stream (IS) of digital video signals including pictures arranged in groups of pictures (GOP), characterized in that said bitrate control block (234) is configured for assigning said value of target bits for each single picture of a group of pictures (GOP).

25. The system of any of the previous claims 15 to 24, characterized in that said quantizer (224) is a part of a transcoder adapted for transcoding an input stream of digital signals (IS) at a first bitrate (B1) into an output <-> (OS) at a second bitrate (B2), said transcoder including a low pass filter (218) followed by a downsampling module (220) for subjecting at least part of said input digital signals to lowpass filtering and downsampling

26. The system of claim 22 and claim 25, characterized in that said low pass filter (218) is arranged upstream of said preanalysis chain (224, 232, 234).

27. The system of claim 25, characterized in that a decimation module is associated with said low-pass filter (218).

28. A computer program product directly loadable in the internal memory of a digital computer and

<-> = <stream of digital signals>

including software code portions for performing the method of any of claims 1 to 16 when the product is run on a computer.

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Enrico Antonielli d'Oulx
Luciano Bosotti
Mauro Marchitelli
Livia Pasqualigo
Giovanni Sertoli
Franco Gallarotti
Cristina Freyria Fava
Alessandra Romeo
Giorgio Crovini
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—————— & ——————
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EPO - Munich
6C

1 8. Nov. 2005

European Patent Office
Directorate General 2
D-80290 Muenchen
Germany

**For the attention of Mr. or Ms. A. Wahrenberg,
Primary Examiner**

November 10, 2005
Our ref.: BEP5363-LB/pb

Re: **European Patent Application No. 03 002 443.4 – 1247
Applicant: STMicroelectronics S.r.l.**

Dear Mr. or Ms. Wahrenberg:

1. I refer to the Communication pursuant to Article 96(2) EPC dated September 1, 2005.

Even if this point is not specifically related to examination per se, I would like to express - also on behalf of the Applicants – appreciation for the extent and detail of the Communication (and the preceding EESR). My understanding is that the EPO is considering the possibility of acknowledging "extra marks" for examination of complex applications. I believe that this one examination procedure should be among those qualifying for such a possible treatment.

2. Turning to the technical merits proper of this application, the Inventors have carefully considered all of the documents D1 to D5 and are offering the following comments.

The instant application in no way aims at patenting dithering as such, which is in fact a well known technique as witnessed e.g. by reference textbooks such as document D3. The invention was devised by specific reference to the need of minimizing the drift that would by way of necessity arise in a device such as a "trans-rater" (namely a device for transcoding digital signals between a first bit-rate and a second bit-rate") operating in the compressed DCT domain and a decoder intended to decode the transcoded stream. Especially in the case of video signals, such a trans-rater (which can be schematically depicted as a partial decoder having cascaded thereto a partial encoder, without however any feedback to compensate for non-linearity introduced by the quantizer) will expectedly generate images belonging to each single GOP which would be visually degraded, this being particularly the case when the trans-rater operates between two largely different bit-

rates. This is primarily due to the fact that re-quantization performed on the input coefficients creates a further error that is not compensated.

The Inventors believe that a significant aspect of the invention of the present application lies in the use of *non-subtractive dithering* as disclosed e.g. on page 24 of the description. According to that aspect of the invention, while a dither signal (namely noise having specific statistical characteristics related to the nature of the (e.g.video) signal being processed) is injected upstream of the quantizer in order to pre-compensate the further error expected to be generated by the re-quantizer, no correction is applied to the inverse quantized signal thus obtained.

The Inventors believe that such non-subtractive dithering is in no way disclosed or suggested by any of the prior art documents cited in the search report. More to the point, *subtractive dithering* namely the presence of an additional block to subtract from the signal the noise previously injected thereinto is explicitly disclosed in both figures 3 and 4 of D1 (see the signals marked $w(n)$, $w_0(n)$ and $w_{M-1}(n)$) positively subtracted after the quantizer blocks Q, Q_0 and Q_{M-1}[1]. The same also applies to document D2 where – despite a certain formal similarity with the arrangement of the invention – page 7, lines 10 to 15 mention the fact that the previously–added pseudorandom number sequence must be subtracted from the previously compressed data (see also figure 8). The Inventors thus believe that none of these documents (nor D3 – essentially a basic reference textbook), nor even documents D4 and D5 (which, as better detailed in the following, primarily focus on other issues) disclose, suggest or merely hint at the invention.

Resorting to non-subtractive dithering makes it possible to minimize the indicated expected drift between transcoder and decoder in a manner that can be reasonably held to be surprising: this at least insofar as the prior art as represented by documents D1 and D2 would incite the person skilled in the art to consider subtractive dithering as a sort of *sine qua non* requirement in order to provide satisfactory operation. The arrangement of the invention makes it possible to use - in order to generate the random dithering noise signals, a statistics distribution which is pre-defined (for instance triangular) based on the analysis of a test-bed of streams that are already compressed. Stated otherwise, such statistical distribution does not need – by way of necessity – to be re-calculated run-time, thus simplifying the system.

A related significant aspect of the invention lies, still in the Inventors' view, in the subject matter of original claim 14, namely the fact that the low-pass filtering exemplified by the block 218 is performed before the "pre-analysis" which constitutes the subject matter of original claim 10. The transcoder described in D5 does indeed exploit motion compensation, which is not the case of the present invention. Even a possible combination

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[1] It will be appreciated i.a. that these are *quantizer* blocks.

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of the teachings of documents D2 and D5 would still fall short of the arrangement described herein. The Inventors do indeed convene in that one could state (as indicated in point 3.5 of the Communication of September 1, 2005) that it would be "natural" to perform the decimation step before pre-analysis. However, the Inventors believe that it would be far from natural (namely far from obvious or non-inventive) to make this in the claimed position <u>without</u> compensating the error obtained and by reducing image resolution not by filtering the pixels but rather by operating directly on the transformed coefficients of the prediction errors. The DCT – inverse DCT operation is certainly non-linear (at least in MPEG2) and may well produce a mismatch depending on the DCT algorithm used (this is due to modelling the $1/\text{sqrt}(2)$ coefficients)[2].

This further aspect of the invention is certainly linked to the non-subtractive dithering aspect considered in the foregoing. In fact, undersampling introduces a new drift in the transcoder which is reduced by the joint action of undersampling the prediction error in the compressed domain and subsequent dithered re-quantization in the compressed domain. This is again a further aspect of the invention which is in no way taught, suggested or even merely hinted at in the prior art documents D1 to D5.

3. In view of the comments above I am amending the application under the provisions of article 86(3) EPC as per the enclosed replacement pages 22 and 24 (description) and 42 to 48 (claims) annexed herewith. The replacement pages now submitted are simply copies of the corresponding pages in the application as presently on file wherein amendments were effected in handwriting (while some minor cut-and-paste re-arrangement of the text was effected to make the amendments more understandable). I believe that the replacement pages enclosed herewith are clearly legible for the printer. I would however be happy to submit any of these pages in fully recast form if you were to suggest to do this.

4. The amendments effected will now be briefly discussed.

4.1 <u>In the claims</u>

4.1.1 In original claims 13 and 29 (now claims 11 and 25) the wording "output *stream of digital signals* at a second bit-rate" was substituted for the wording "output stream at a second bit rate" to achieve thorough conformity with the wording "an input *stream of digital signals* at a first bit rate" already appearing in the same claims. I believe this should settle the point raised at section 1 of the Communication of September 1, 2005.

4.1.2 Claim 1 was a recast in the two-part form by using as the preamble a

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[2] Incidentally, specific IEEE tests exist for checking the accuracy of that result.

combination of original claim 1 and claim 8 as well as the first part of original claim 3. Such a combination of features appears to be derivable from D2, which was therefore held to be representative of the closest prior art. The characterising portion was mainly derived from the definition of non-subtractive dithering as provided on page 24 of the description.

There, reference is made to two different types of dithering, namely subtractive (which is now disclaimed) and non-subtractive (now specifically claimed in claim 1). Subtractive dithering is described as an arrangement wherein the random or pseudo-random dithering noise signal added to the input signal before quantization is subtracted after the inverse quantization block in order to reconstruct the input signal thus removing the artefacts due to the non linear characteristic of the quantizer. Non-subtractive dithering, namely dithering wherein the input signal of the quantizer is the same, but no correction in applied to the inverse quantized signal was thus claimed by resorting to the following definition:

"leaving said signal subjected to inverse quantization exempt from correction effected by subtracting therefrom said dither signal, whereby said signal subjected to inverse quantization contains artifacts due to the non-linear characteristic of the quantization".

As far as I can see, such a proposed wording i) provides a positive recitation of a feature, and ii) does not convey new matter to the application and therefore does not contravene Article 123 EPC.

4.1.3 As a consequence of the amendment described in the foregoing, claim 3 in its original wording (intended to cover subtractive dithering) was deleted. Claim 2 is left unamended, while original claims 4 to 7 and 9 to 16 are maintained as new claims 3 to 14 in the application. Corresponding amendments were effected in the original system claims 17 to 31 resulting in new system claims 15 to 27. The original "IBM-type" claim 32 was renumbered as new claim 28. The functional dependencies were amended throughout as required.

4.2 In the description

4.2.1 On page 22, document D2 was cited as the closest prior art after which the preambles of independent claims 1 and 15 were patterned. Document D1 was also cited as a document of interest for the invention, while minor formal amendments were effected in order to achieve thorough conformity with the new claim wording/numbering.

4.2.2 On page 24, line 14 specific reference is made to non-subtractive dithering being according to the invention.

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4.3 Miscellaneous

4.3.1 While the discussion of the merits of the invention in previous point 2 specifically mentions the contents of original claim 14 (low pass filtering being performed before the "pre-analysis" of original claim 10) the corresponding features were not included – at least for the time being – in the independent claims of the application. The Inventors' believe that the subject matter of present independent claims 1 and 15 already defines a full, complete invention patentably distinguishing over the prior art, whereby restricting the scope of those claims to the subject matter of original claim 14 (and the intervening claims) would amount to an undue restriction of the scope of protection they feel entitled to.

4.3.2 Pending possible agreement with the Examiner as to the allowability of the instant application, I did not perform a detailed review of the description in search of possible places that may be inconsistent with the invention as now claimed. A first cursory review however failed to locate any such places. On page 26, line 2 *"fo"* should be obviously amended to read *"for"*. I would be grateful if this amendment could be effected by the Examiner *ex officio*, thus avoiding submission of a further replacement page.

5. In view of the amendments effected, the Inventors and the representative believe that the application fulfils the requirements of the European Patent Convention and is therefore in condition for grant. Such a step is thus respectfully solicited. Just be way of precaution, Oral Proceedings under Article 116 EPC are requested to be summoned in case the Examining Division were to form, now or at a later stage, an unfavourable attitude towards the invention and thus be prone to finally reject the application. Again, I re-iterate my invitation for the Examiner to kindly contact me for a telephone consultation in order to discuss any points held to be still outstanding.

Very Truly Yours
The Representative

Luciano Bosotti
c/o Buzzi, Notaro & Antonielli d'Oulx

Encl.: replacement pages 22, 24 (description) and 42 to 48 (claims)

Dharia, Prabodh M.

From: Burton, Carol W. [CWBurton@HHLAW.com]
Sent: Monday, October 01, 2007 2:45 PM
To: Dharia, Prabodh M.
Subject: Serial No. 10/757,961

Examiner Dharia:

Attached are the documents we discussed from the counterpart EPO case. Please confirm receipt by return email.

Thank you for your consideration.

Best regards,

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10/1/07

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Application No.	Ref.	Date
03 002 443.4 - 1247	BEP5363-LB	01.09.2005
Applicant STMicroelectronics S.r.l.		

Communication pursuant to Article 96(2) EPC

The examination of the above-identified application has revealed that it does not meet the requirements of the European Patent Convention for the reasons enclosed herewith. If the deficiencies indicated are not rectified the application may be refused pursuant to Article 97(1) EPC.

You are invited to file your observations and insofar as the deficiencies are such as to be rectifiable, to correct the indicated deficiencies within a period

of   4   months

from the notification of this communication, this period being computed in accordance with Rules 78(2) and 83(2) and (4) EPC.

One set of amendments to the description, claims and drawings is to be filed within the said period on separate sheets (Rule 36(1) EPC).

Failure to comply with this invitation in due time will result in the application being deemed to be withdrawn (Article 96(3) EPC).

Wahrenberg, A.
Primary Examiner
for the Examining Division

Enclosure(s):   6 page/s reasons (Form 2906)

Registered Letter

The examination is being carried out on the **following application documents**:

Description, pages:

1-41   as originally filed

Claims, No.:

1-32   as originally filed

Drawings, sheets:

1/3   as originally filed

The following documents, cited in the search report, are referred to in this communication; the numbering will be adhered to in the rest of the procedure:

D1: Chen T: "Elimination of subband-coding artifacts using the dithering technique" Proceedings Of The International Conference On Image Processing (icip) Austin, Nov. 13 - 16, 1994, Los Alamitos, IEEE Comp. Soc. Press, Us (13-11-1994), 3 CONF. 1, 874-877

D2: EP-A-0509576

D3: Papoulis A "Probability, random variables, and stochastic processes", McGraw-Hill, 1991, pages 101 and 136-137.

D4: Wang J et al: "Dynamic rate scaling of coded digital video for IVOD applications" IEEE Transactions On Consumer Electronics, IEEE Inc. New York, Us (02-06-1998), 44(3), 743-749

D5: WO-A-0195633

1.   The application does not meet the requirements of Article 84 EPC, because claims 13 and 29 are not clear since it is not clear what is meant by "a transcoding process between an input stream of digital signals at a first bitrate and an *output bitrate at a second*

bitrate".

2.   The present application does not meet the requirements of Article 52(1) EPC, because the subject-matter of claims 1-5, 8, 16-24 and 32 is not new in the sense of Article 54(1) and (2) EPC.

2.1. Either of D1 or D2 discloses a method of converting digital signals between a first and second format (D1, abstract (the first format is the uncompressed signal and the second format the compressed signal) and D2, page 3, lines 3-5), the method including the step of generating coefficients representative of such digital signals and the step of subjecting such coefficients to quantization (D1, abstract and D2, abstract) characterized in that it includes the steps of:
      - generating a dither signal (D1, paragraph 2 and D2, page 7, lines 2-5), and
      - adding said dither signal to said coefficients before said quantization to generate a quantized signal (D1, paragraph 2 and D2, page 7, lines 2-5).

Therefore, the subject-matter of claim 1 is not new (Article 54(1) and (2) EPC).

2.2. D1 discloses dithered quantization with a uniform quantization step (paragraph 2).

Therefore, the subject-matter of claim 2 is not new (Article 54(1) and (2) EPC).

2.3. D2 further discloses the steps of
      - subjecting said quantized signal to inverse quantization, and
      - subtracting said dither signal from said signal subjected to inverse quantization (page 13, lines 53-56).

Therefore, the subject-matter of claim 3 is not new (Article 54(1) and (2) EPC).

2.4. D1 discloses a method for dithered quantization including the steps of:
      - subjecting each coefficient to a first quantization step in the absence of any dither signal being added, to generate an undithered quantized coefficient,
      - checking if said undithered quantized coefficient is equal to zero, and
      - when said undithered quantized coefficient is equal to zero, taking said undithered

quantization coefficient as said quantized signal, and

- when said undithered quantized coefficient is different from zero, adding said dither signal to said coefficient and subjecting sad dither coefficient to a quantization step to generate said quantized signal (paragraph 2, section Remarks, point 2).

Therefore, the subject-matter of claim 4 is not new (Article 54(1) and (2) EPC).

2.5. Either of D1 or D2 discloses a dither signal of which the spectrum is selected from the group consisting of Gaussian, uniform, sinusoidal and triangular (D1, paragraph 2 and D2, page 8 lines 2-4).

Therefore, the subject-matter of claim 5 is not new (Article 54(1) and (2) EPC).

2.6. Either of D1 or D2 discloses subjecting a digital signal to a discrete cosine transform to generate the coefficients to which the dither signal is added before the coefficients being quantized as DCT coefficients (D1, abstract; paragraph 4 and D2, page 8 lines 37-39).

Therefore, the subject-matter of claim 8 is not new (Article 54(1) and (2) EPC).

2.7. D2 discloses a transcoding process between an input stream of digital signals at a first bit rate and an output stream of digital signals at a second bit rate (page 3, lines 9-12; figure 1), said second bit rate of said output stream of digital signals being selectively controlled (page 3, line 57 - page 4 line 7) .

Therefore, the subject-matter of claim 9 is not new (Article 54(1) and (2) EPC).

2.8. D2 further discloses a preanalysis process including:
- quantizing the signals with a given quantization step (mquant), and
- evaluating the number of bits spent for coding said coefficients, and in that said bit rate of said output data stream is controlled as a function of said preanalysis (page 4, line 48-54).

Therefore, the subject-matter of claim 10 is not new (Article 54(1) and (2) EPC).

2.9. D2 further discloses a transcoder in which the bit rate control is of a proportional-integrative type (page 3, line 57 - page 4 line 7).

Therefore, the subject-matter of claim 11 is not new (Article 54(1) and (2) EPC).

2.10. D1 further discloses dithered quantization applied to MPEG encoded signals (paragraph 4).

Therefore, the subject-matter of claim 16 is not new (Article 54(1) and (2) EPC.

2.11. The subject-matter of claim 17-21 and 24-27 corresponds to that of claim 1-5 and 8-11, of which claim 17-21 and 24-27 are mirrors in terms of physical units.

Therefore, the objections raised in respect of claim 1-5 and 8-11 also apply to claim 17-21 and 24-27.

2.12. D1 discloses a computer program product directly loadable in the internal memory of a digital computer and including software code portions (paragraph 4. NB note 3) for performing the method of claims 1-5, 8, 16-21, 24, and 32 (see above comments).

Therefore, the subject-matter of claim 32 is not new (Article 54(1) and (2) EPC.

3. The present application does not meet the requirements of Article 52(1) EPC, because the subject-matter of claims 6, 7, 12-15, 22, 23 and 28-31 does not involve an inventive step in the sense of Article 56 EPC.

3.1. D3 discloses modification of a uniform distribution to obtain the distribution function of any distribution $F_y(y)$ (page 101), e.g. Gaussian or triangular distribution.

D3 is a general textbook on probability theory and random variables. Undoubtedly, the skilled person has the knowledge required to be able to apply probability theory in his field of competence. Therefore, the subject-matter of claim 6 is not inventive (Article 56).

3.2. D3 further discloses generation of a random variable with a PDF f(x,y) from two

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independent random variables x and y with probability density functions $f_x(x)$ and $f_y(y)$ respectively (page 136- 137, figure 6-9).

Applying this theory to generated a pseudo-random noise signal does not involve an inventive step for the skilled person (see also point 2.1). Therefore the subject-matter of claim 7 lacks inventive step (Article 56 EPC).

3.3. D4 discloses a transcoder with a two pass encoder in which the input stream is a stream of digital video signals including pictures arranged in groups of pictures, and wherein said bit rate control assign value of target bits for each single picture of a group of pictures (paragraph IV).

The skilled person would when combining the transcoder of D4 with the one of D2 arrive at the same subject-matter as in claim 12 and therefore, this claim is not inventive (Article 56 EPC).

3.4. D5 discloses a transcoding process between an input stream of digital signals at a first bit rate and an output bit stream at a second bit rate (page 10, lines 5-7), said transcoding process including subjecting at least part of said input digital signals to a low pass filtering step followed by a downsampling step (page 31 lines 13-17; page 38, lines 15-17).

It is obvious for the skilled person that when combining the dithered quantization method of either D1 or D2 with the size transcoder of D5, one arrives at the same solution as claimed in claim 13. Therefore, claim 13 does not involve an inventive step (Article 56 EPC).

3.5. In D5, the low-pass filtering and decimation is applied to the DCT-coefficients before quantization. This is normally the way downconversion is performed. Therefore, when combining the features of claim 10 with the features of claim 13, it is natural to perform the decimation step before the preanalysis.

Hence, it is obvious for the skilled person to combine D2 (see point 1.9) with D5 (point 2.4) in order to arrive at the subject matter of claim 14. Therefore, claim 14 does not involve an inventive step (Article 56).

3.6. D5 further discloses a rate scaling transcoder in which together with the low-pass filtering a decimation step is executed (page 31 lines 13-17; page 38, lines 15-17).

In accordance with the reasoning of point 2.4, it is obvious for the skilled person that D5 could be combined with either D1 or D2 to arrive at the subject-matter of claim 15, which is therefore not inventive (Article 56 EPC).

3.7. The subject-matter of claim 22, 23 and 28-31 corresponds to that of claim 6, 7 and 12-15, of which claim 22, 23 and 28-31 are mirrors in terms of physical units.

Therefore, the objections raised in respect of claim 6, 7 and 12-15 also apply to claim 22, 23 and 28-31.

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